Diese Website verwendet Cookies von Google, um Dienste anzubieten und den Traffic zu analysieren. Deine IP-Adresse und dein User-Agent werden zusammen mit Messwerten zur Leistung und Sicherheit für Google freigegeben. So können Nutzungsstatistiken generiert, Missbrauchsfälle erkannt und behoben und die Qualität des Dienstes gewährleistet werden.

WEITERE INFORMATIONEN OK

Wednesday, February 08, 2006

From accounting to mathematics

I've noticed that there are strong parallels between accounting and two important areas of mathematics -- the elementary algebra and the calculus. I suspect these reflect the origins of algebra in accounting and origins of some of the basic concepts behind the calculus in accounting. Readily available references to the history of accounting and mathematics may be too scant to prove it, but I think the parallels are quite suggestive.

A basic parallel between accounting and algebra is the balance metaphor. The origin of this metaphor was almost surely the balance scale, an ancient commercial tool for measuring the weight of precious metals and other commodities. Standard weights would be added or removed from the scale until balance with the commodity to be weighed was achieved.

Starting with the "accounting equation," **assets = liabilities + equity,** the strategy of accounting as with algebra is to achieve numerical balance by filling in missing quantities. As far back as the Sumerians the need for balance in accounting was widely understood, but it was expressed either in purely verbal or purely ledger form rather than with an algebraic notation.(Simarily, logic was expressed in standard language rather than with its own abstract symbolic notation until Gottleib Frege in the 19th century). Furthermore, examples of algebraic work left by the Sumerians, Babylonians, and Indians, and indeed up to the time of Fibonacci and Pacioli, typically involved accounting problems.

Calculus largely has its origins in the study of change and how a dynamic view of the world relates to a static view of the world. Newton called calculus the study of "fluxions," or units of change. (This is a more descriptive label for the field than "calculus" which simply means "calculating stone" and has been used to refer to a wide variety of areas of mathematics and logic). Long before Newton, the relationship between the static and the dynamic was probably first conceptualized as the relationship between the balance sheet and the income statement. The balance sheet, which can be summarized as

assets = liabilities + equity

is the "integral" of the income statement which can be summarized as

revenues = expenses + net income

(in other words, the income statement is the "derivative" of the balance sheet: the change in the balance sheet over a specific period of time).

About Me

Nick Szabo

"A premier thinker about history, law and economics, and the lessons they have for security." -- Adam Shostack, Emergent Chaos

"Szabo comes out with these essays that leave me in awe." -- Brian Dunbar

"Reading material that is eclectic, challenging and endlessly fascinating." -- Sean McGrath, Propylon

"Like most blogs worth my attention, this blog is updated only infrequently. That is because the authors of blogs worth my attention only post when they have something to say that is true, relevant and not already known by their audience. Most of the human race does not have the skill to know when an idea has these three properties. The skill is particularly rare in the fields of politics and economics, which is why this blog is such a rare and valuable thing." -- Richard Hollerith

Earlier civilizations had only mapped large scales of time to a spatial visualization in the form of a calendar. Diaries and accounting ledgers ordered by time also crudely map time into space. The sundial mapped time into space, but in a distorted manner. Medieval Europeans with the invention of the mechanical clock and of musical notation including rhythm expanded and systematized the mapping of time to a spatial visualization with consistent units. William of Occam and other Scholastics visualized time as a spatial dimension and other phenomena (including temperature, distance, and moral qualities) as orthogonal dimensions to be graphed against time. Occam then used methods of Archimedes to calculate absolute quantities from the area under such curves, but we awaited Newton and Leibniz, building on the analytical geometry of DesCartes, which systematically related algebraic equations to spatial curves, to create a systematic calculus. Earlier in India, the algebra and much of the differential calculus were also developed within or alongside a rich business culture in which bookeeping using "Arabic" numerals (also invented in Inda) was also widespread. I conclude that the conceptual apparatus behind much traditional mathematics originated in commercial accounting techniques.

A big exception to this is geometry. Geometry developed primarily from the need to define property rights in the largest form of wealth from the neolithic until quite recently, namely farmland, but that is another blog post for another day.

Posted by Nick Szabo at 10:06 AM

1 comment:

Anonymous said...

Hey, I recently added a news widget from www.widgetmate.com to my blog. It shows the latest news, and just took a copy and paste to implement. Might interest you too.

9:03 AM

Post a Comment

Newer Post Home Older Post

Subscribe to: Post Comments (Atom)

Blog Archive

- ► 2018 (1)
- ► 2017 (3)
- ► 2016 (4)
- ► 2015 (3)
- ► 2014 (3)
- ► 2013 (3)
- ► 2012 (8)
- ► 2011 (12)
- ► 2010 (9)
- ► 2009 (29)
- ► 2008 (55)
- ► 2007 (47)
- ▼ 2006 (130)
  - ► December (4)
  - ► November (7)
  - ► October (15)
  - ► September (15)
  - ► August (20)
  - ► July (5)
  - ► June (10)
  - ► May (4)
  - ► April (3)
  - ► March (11)
  - ▼ February (10)
    - The irreducible complexity of society
    - The constitutionality of federal charity
    - Some lost frontier wisdom
    - The Roundhead Revolution?
    - Moot court fun
    - Time, sacrifice, and value
    - Where are you now?
    - From accounting to mathematics
    - Executive power and the interpretation of laws

Mechanism, not policy

► January (26)

► 2005 (44)

Simple theme. Powered by Blogger.